

CLAIMS

1. A rubber composition comprising a diene elastomer, a reinforcing inorganic filler, a
5 coupling agent providing the bond between the inorganic filler and the elastomer, wherein
said inorganic filler comprises a silicon carbide having the following features :

- (a) a BET specific surface area of between 20 and 200 m²/g;
- (b) an average particle size by mass, noted d_w, of between 10 and 350 nm.

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2. The composition according to Claim 1, wherein the quantity of reinforcing inorganic
filler is between 30 and 200 phr (parts by weight per hundred parts of elastomer).

3. The composition according to Claim 2, wherein the amount of silicon carbide is
15 greater than 50 phr.

4. The composition according to Claim 1, wherein said reinforcing inorganic filler
further comprises silica or alumina.

20 5. The composition according to Claim 1, further comprising carbon black.

6. The composition according to Claim 5, wherein the amount of carbon black is
between 2 and 20 phr.

7. The composition according to Claim 1, wherein the BET surface area is between 20 and 150 m²/g.

8. The composition according to Claim 7, wherein the BET surface area lies within a 5 range from 25 to 140 m²/g.

9. The composition according to Claim 1, wherein the size d_w lies within a range from 20 to 300 nm.

10 10. The composition according to Claim 9, wherein the size d_w lies within a range from 20 to 250 nm.

11. The composition according to Claim 1, wherein the silicon carbide has a disagglomeration rate α which is greater than $1 \times 10^{-4} \mu\text{m}^{-1}/\text{s}$.

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12. The composition according to Claim 11, wherein the silicon carbide has a disagglomeration rate α which is greater than $5 \times 10^{-4} \mu\text{m}^{-1}/\text{s}$.

13. The composition according to Claim 12, wherein the silicon carbide has a 20 disagglomeration rate α which is greater than $1 \times 10^{-3} \mu\text{m}^{-1}/\text{s}$.

14. The composition according to Claim 1, wherein the coupling agent is a polysulfurized alkoxy silane.

15. The composition according to Claim 1, wherein the diene elastomer is selected from among the group consisting of polybutadienes, synthetic polyisoprenes, natural rubber, butadiene-styrene copolymers, butadiene-isoprene copolymers, butadiene-acrylonitrile copolymers, isoprene-styrene copolymers, butadiene-styrene-isoprene copolymers and mixtures thereof.

16. The composition according to Claim 15, wherein the diene elastomer is a butadiene-styrene copolymer (SBR) having a styrene content of between 20% and 30% by weight, a content of vinyl bonds of the butadiene fraction of between 15% and 65%, a content of 10 trans-1,4 bonds of between 20% and 75% and a glass transition temperature of between -20°C and -55°C.

17. The composition according to Claim 16, wherein the SBR is a SBR prepared in solution (SSBR) and used in a mixture with a polybutadiene having more than 90% cis-1,4 bonds.

18. A process for obtaining a rubber composition usable for the manufacture of tires, wherein there are incorporated into at least a diene elastomer, at least a reinforcing inorganic filler and a coupling agent providing the bond between the inorganic filler and the 20 elastomer, wherein said inorganic filler comprises a silicon carbide having the following features:

- (a) a BET specific surface area of between 20 and 200 m²/g;
- (b) an average particle size (by mass), d_W, of between 10 and 350 nm,

and wherein the entire mixture is kneaded thermomechanically, in one or more stages, until
a maximum temperature of between 110°C and 190°C is reached.

19. The process according to Claim 18, wherein the quantity of reinforcing inorganic

5 filler is between 30 and 200 phr (parts by weight per hundred parts of elastomer).

20. The process according to Claim 19, wherein the amount of silicon carbide is greater

than 50 phr.

10 21. The process according to Claim 18, wherein said reinforcing inorganic filler further
comprises silica or alumina.

22. The process according to Claim 18, further comprising incorporating carbon black.

15 23. The process according to Claim 22, wherein the amount of carbon black is between 2
and 20 phr.

24. The process according to Claim 18, wherein the BET surface area is of between 20
and 150 m²/g.

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25. The process according to Claim 24, wherein the BET surface area lies within a range
from 25 to 140 m²/g.

25 26. The process according to Claim 18, wherein the size d_w lies within a range from 20 to
300 nm.

27. The process according to Claim 26, wherein the size d_w lies within a range from 20 to 250 nm.

5 28. The process according to Claim 18, wherein the silicon carbide has a disagglomeration rate α which is greater than $1 \times 10^{-4} \mu\text{m}^{-1}/\text{s}$.

29. The process according to Claim 28, wherein the silicon carbide has a disagglomeration rate α which is greater than $5 \times 10^{-4} \mu\text{m}^{-1}/\text{s}$.

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30. The process according to Claim 29, wherein the silicon carbide has a disagglomeration rate α which is greater than $1 \times 10^{-3} \mu\text{m}^{-1}/\text{s}$.

31. The process according to Claim 18, wherein the diene elastomer is selected from among the group consisting of polybutadienes, synthetic polyisoprenes, natural rubber, butadiene-styrene copolymers, butadiene-isoprene copolymers, butadiene-acrylonitrile copolymers, isoprene-styrene copolymers, butadiene-styrene-isoprene copolymers and mixtures thereof.

20 32. The process according to Claim 18, wherein the maximum kneading temperature is between 130°C and 180°C.

33. A tire comprising a rubber composition comprising a diene elastomer, a reinforcing inorganic filler, a coupling agent providing the bond between the inorganic filler and the

elastomer, wherein said inorganic filler comprises a silicon carbide having the following features :

- (a) a BET specific surface area of between 20 and 200 m²/g;
- 5 - (b) an average particle size by mass, noted d_w, of between 10 and 350 nm.

34. The tire according to Claim 33, wherein the quantity of reinforcing inorganic filler is between 30 and 200 phr (parts by weight per hundred parts of elastomer).

10 35. The tire according to Claim 34, wherein the amount of silicon carbide is greater than 50 phr.

36. The tire according to Claim 33, wherein said reinforcing inorganic filler further comprises silica or alumina.

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37. The tire according to Claim 33, wherein the rubber composition further comprises carbon black.

38. The tire according to Claim 37, wherein the amount of carbon black is between 2 and 20 20 phr.

39. The tire according to Claim 33, wherein the BET surface area is between 20 and 150 m²/g.

40. The tire according to Claim 39, wherein the BET surface area lies within a range from 25 to 140 m²/g.

41. The tire according to Claim 33, wherein the size d_w lies within a range from 20 to 5 300 nm.

42. The tire according to Claim 41, wherein the size d_w lies within a range from 20 to 250 nm.

10 43. The tire according to Claim 33, wherein the silicon carbide has a disagglomeration rate α which is greater than 1x10⁻⁴ μm⁻¹/s.

44. The tire according to Claim 43, wherein the silicon carbide has a disagglomeration rate α which is greater than 5x10⁻⁴ μm⁻¹/s.

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45. The tire according to Claim 44, wherein the silicon carbide has a disagglomeration rate α which is greater than 1x10⁻³ μm⁻¹/s.

20 46. The tire according to Claim 33, wherein the coupling agent is a polysulfurized alkoxy silane.

47. The tire according to Claim 33, wherein the diene elastomer is selected from among the group consisting of polybutadienes, synthetic polyisoprenes, natural rubber, butadiene-styrene copolymers, butadiene-isoprene copolymers, butadiene-acrylonitrile copolymers, 25 isoprene-styrene copolymers, butadiene-styrene-isoprene copolymers and mixtures thereof.

48. A tire tread comprising a rubber composition comprising a diene elastomer, a reinforcing inorganic filler, a coupling agent providing the bond between the inorganic filler and the elastomer, wherein said inorganic filler comprises a silicon carbide having the
5 following features :

- (a) a BET specific surface area of between 20 and 200 m²/g;
- (b) an average particle size by mass, noted d_w, of between 10 and 350 nm.

10 49. The tread according to Claim 48, wherein the quantity of reinforcing inorganic filler is between 30 and 200 phr (parts by weight per hundred parts of elastomer).

50. The tread according to Claim 49, wherein the amount of silicon carbide is greater than 50 phr.

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51. The tread according to Claim 48, wherein said reinforcing inorganic filler further comprises silica or alumina.

52. The tread according to Claim 48, wherein the rubber composition further comprises
20 carbon black.

53. The tread according to Claim 52, wherein the amount of carbon black is between 2 and 20 phr.

54. The tread according to Claim 48, wherein the BET surface area is between 20 and 150 m²/g.

55. The tread according to Claim 54, wherein the BET surface area lies within a range 5 from 25 to 140 m²/g.

56. The tread according to Claim 48, wherein the size d_w lies within a range from 20 to 300 nm.

10 57. The tread according to Claim 56, wherein the size d_w lies within a range from 20 to 250 nm.

58. The tread according to Claim 48, wherein the silicon carbide has a disagglomeration rate α which is greater than $1 \times 10^{-4} \mu\text{m}^{-1}/\text{s}$.

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59. The tread according to Claim 58, wherein the silicon carbide has a disagglomeration rate α which is greater than $5 \times 10^{-4} \mu\text{m}^{-1}/\text{s}$.

20 60. The tread according to Claim 59, wherein the silicon carbide has a disagglomeration rate α which is greater than $1 \times 10^{-3} \mu\text{m}^{-1}/\text{s}$.

61. The tread according to Claim 48, wherein the coupling agent is a polysulfurized alkoxy silane.

62. The tread according to Claim 48, wherein the diene elastomer is selected from among the group consisting of polybutadienes, synthetic polyisoprenes, natural rubber, butadiene-styrene copolymers, butadiene-isoprene copolymers, butadiene-acrylonitrile copolymers, isoprene-styrene copolymers, butadiene-styrene-isoprene copolymers and mixtures thereof.

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63. The tread according to Claim 62, wherein the diene elastomer is a butadiene-styrene copolymer (SBR) having a styrene content of between 20% and 30% by weight, a content of vinyl bonds of the butadiene fraction of between 15% and 65%, a content of trans-1,4 bonds of between 20% and 75% and a glass transition temperature of between -20°C and -55°C.

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64. The tread according to Claim 63, wherein the SBR is a SBR prepared in solution (SSBR) and used in a mixture with a polybutadiene having more than 90% cis-1,4 bonds.

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